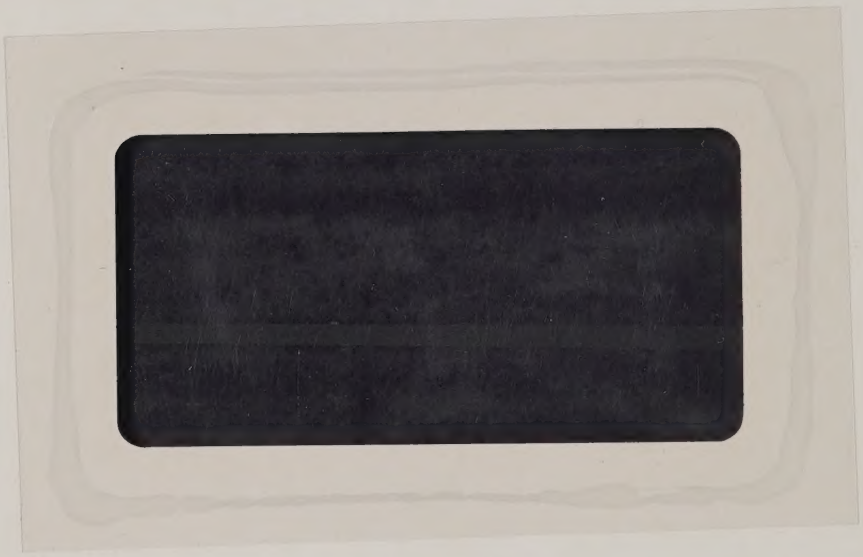
Anritsu

MU163000A
200M Clock Generator Unit
Operation Manual

Read this manual before using the equipment.
Keep this manual with the equipment.



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First Edition

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Measuring Instruments Division
Measurement Group
ANRITSU CORPORATION

Document No. : M-W1187AE-1.0

NOV.
1998

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Insure that you clearly understand the meanings of the symbols BEFORE using the equipment.
Some or all of the symbols may not be used on this equipment. In addition, when drawings are included in this manual, labels on the equipment may not be shown on them.

Safety Symbols Used in Manual

DANGE This indicates a very dangerous procedure that could result in death or serious injury if not performed properly

WARNIN This indicates a hazardous procedure that could result in death or serious injury if not performed properly

CAUTION This indicates a hazardous procedure or danger that could result in light-to-serve injury, or loss related to malfunction, if proper precautions are not taken.

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This indicates warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in box.

This indicates that the marked part should be recycled.

MU163000A 200M Clock Generator unit
Operation Manual
31 August 1998 (First Edition)

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For Safety

WARNING ⚠

1. ALWAYS refer to the operation manual when working near location at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.
   Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangerous.

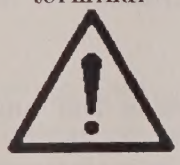
Repair

WARNING ⚠

2. This equipment cannot be repaired by the user. DO NOT attempt to open the cabinet or to disassemble internal parts. Only Anritsu-trained service personnel or staff from your sales representative with a knowledge of electrical fire and shock hazards should service this equipment. These are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision parts.

CAUTION ⚠

Measurement terminal



Don't input a signal which is excessive electric circuit exceed a definite rule between the terminal and earth. There is a possibility to be damaged the inside equipment.

Equipment Certificate

Anritsu Corporation certifies that this equipment was tested before shipment using caribrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories including the Electrotechnical Laboratory, National Research Laboratory and the Communication Research Laboratory, and was found to meet the published specification.

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of- charge if malfunction occurs within 1 year after shipment due to manufacturing fault, provided that this warranty is rendered void under any or all of following condition.

- The fault is outside the scope of the warranty conditions described in operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by customer.
- The fault is due to natural disaster including fire, flooding, earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of non-specified power supply or in a non-specified installation location.

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INTRODUCTION

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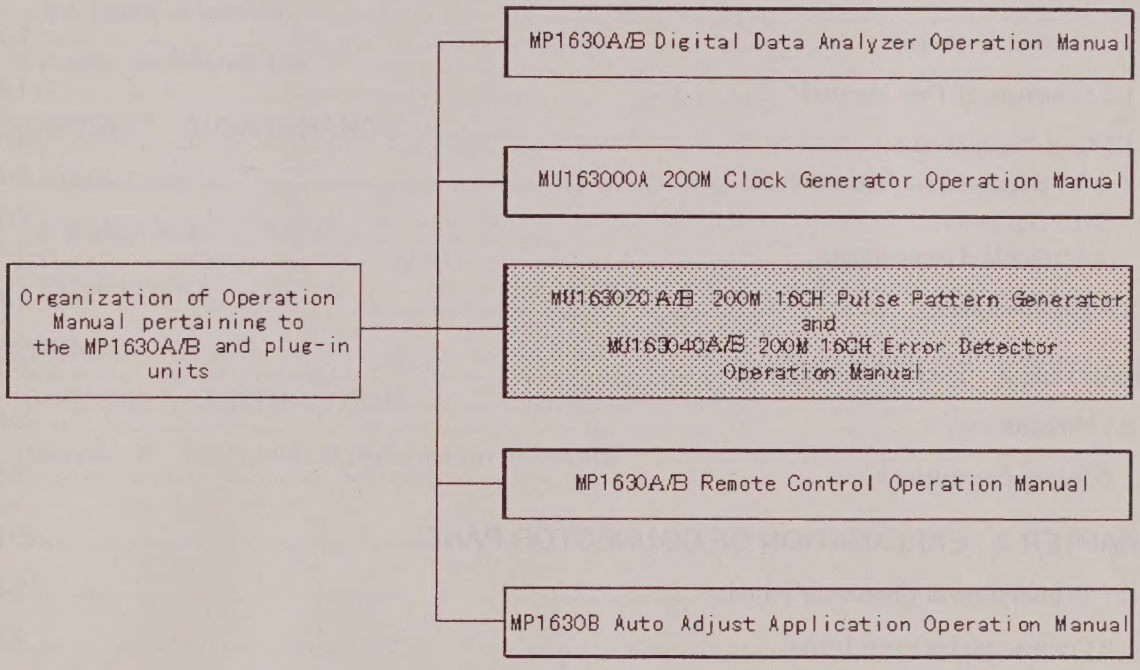
Operation Manual are divided into five volumes pertaining to the MP1630A/B digital data analyzer itself and the individual plug-in units. Use these user's guides to suit intended applications.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MP1630B Auto Adjust Application Operation Manual

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- MP1630B Auto adjust Application Option Manual (only MP1630B)

  Explains how to operate the relevant to the MP1630B Auto Adjust Application Operation Manual.

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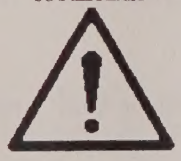

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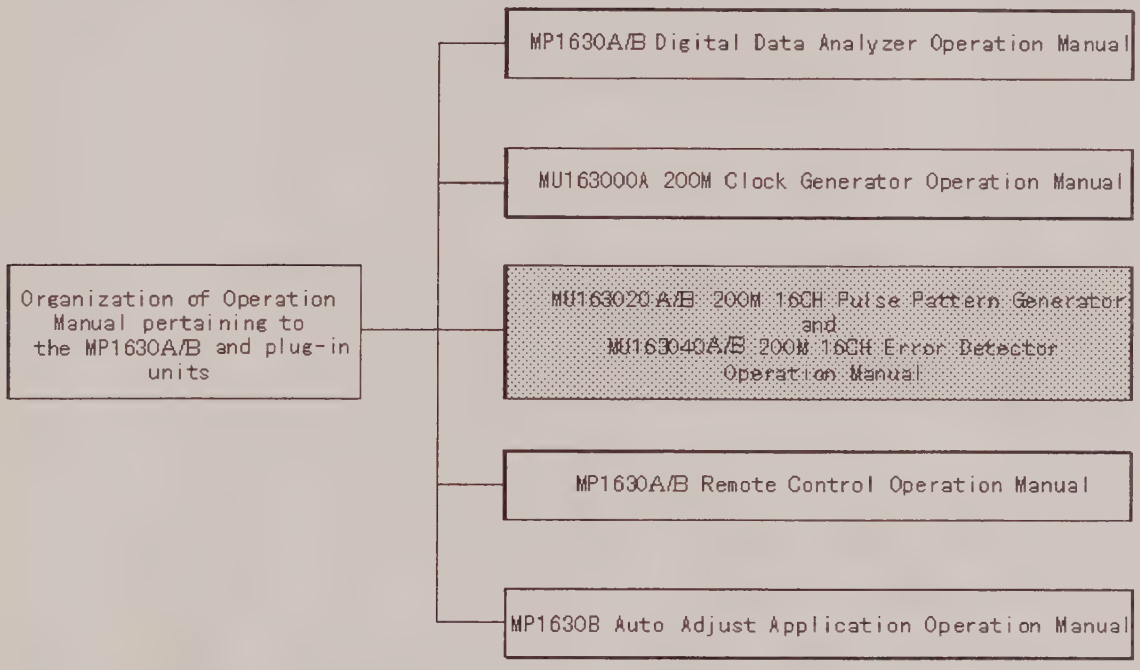
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CONTENS

FOR SAFETY

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CHAPTER 1 INTRODUCTION

1.1 Product Overview

The MU163000A 200M Clock Generator (hereafter called "this unit") can plug into the slot in the MP1630A/B digital analyzer. This unit can generate clock pulses within the range of 10 kHz to 200 MHz. Plugging in this unit, PPG units, and ED unit in the slots of the MP1630A/B allows you to evaluate various digital communication systems, modules (e.g., O/E-E/O), and digital ICs. This unit is suitable for research and development, and production.

Features

- Clock frequencies of 10 kHz to 200 MHz
  This unit can generate clock signals with frequencies of 10 kHz to 200 MHz, allowing you to test various systems and devices.
- Jitter addition function (option 01)
  This unit is provided with a jitter modulation function conforming to ITU-T Recommendation O.171.

1.2 Structure of This Manual

This manual describes the functions and usage of the MU163000A 200M Clock Generator. It consists of seven chapters, an appendix, and an index.

Chapter	Description
CHAPTER 1 INTRODUCTION	Product overview, organization of this manual, unit configuration, and specifications
CHAPTER 2 PREPARATION	Environmental conditions of installation site, safety precautions, and setup before power-on
CHAPTER 3 EXPLANATION OF CONNECTOR PANEL	Layout and functions of connectors on connector panel, and explains of connection method.
CHAPTER 4 EXPLANATION OF SCREENS	Screen configuration
CHAPTER 5 OPERATION	How to use individual functions
CHAPTER 6 PERFORMANCE TEST	Performance test items and procedures
CHAPTER 7 MAINTENANCE	Daily maintenance, calibration, maintenance method, and transportation method
APPENDIX	Factory settings
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1.3 Unit Configuration

1.3.1 Standard configuration

The standard configuration of this unit is as follows:

Table 1-1 Standard configuration

Item	Type name	Product name	Quantity	Remarks
Unit configuration	MU163000A	200M Clock Generator UNIT	1	
Accessories	W1187AE	MU163000A Operation Manual	1	

1.3.2 Options

Options available for this unit are as follows:

Table 1-2 Options

Type name	Product name	Remarks
MU163000A-01	Jitter addition	

1.3.3 Applied components

Options available for this unit are as follows:

Table 1-3 Applied components

Type name	Product name	Remarks
J0776D	Coaxial cord (BNC-P-3W•3D-2W•BNC-P-3W)	2m, Double shield

1.4 Specifications

Specifications of this unit are summarized in Table 1-4.
To implement the function marked with *, an option is required. The contents are given to margin.

Table 1-4 Specifications (1/3)

Item		Specifications
Input interface	Clock input	
	Operating frequency range	10 kHz to 200 MHz
	Level	0.5 Vp-p to 2.0 Vp-p (AC)
	Termination condition	50 ohm to GND
	Waveform	Square wave (10 kHz ≦ f < 10 MHz) Square or sine wave (10 MHz ≦ f ≦ 200 MHz)
	Number of inputs	1 channel
	Connector	BNC
	Reference clock input	
	Frequency	10 MHz ±100 ppm, 64 kHz ±100 ppm
	Level	0.5 Vp-p to 2.0 Vp-p
	Termination condition	50 ohm to GND
	Waveform	Square or sine wave (10 MHz) Square wave (64 kHz)
	Number of inputs	1 channel
	Connector	BNC
Output interface	Clock output	
	Frequency range	10 kHz to 200 MHz 10 kHz ≦ f ≦ 1 MHz (in-100 Hz steps) 1 MHz < f ≦ 200 MHz (in-1 kHz steps)
	Frequency accuracy	±2 ppm (Depends on the accuracy of the external reference clock input used for synchronization)
	Level	V_{OH}: -1.1 V ±0.1 V V_{OL}: -1.5 V ±0.1 V
	Termination condition	50 ohm to -1.3 V
	SSB phase noise	-85 dBc/Hz or lower (10 kHz offset)
	Subharmonic spurious	-55 dBc or lower
	Non-harmonic spurious	-60 dBc or lower
	Duty	50 ±2.5%
	Number of outputs	2 channels
	Connector	SMA
	Reference clock output	
	Frequency	10MHz±2ppm(Depends on the accuracy of the external reference clock input used for synchronization)
	Level	1Vp-p±20%(AC)
	Termination condition	50 ohm to GND
	Number of outputs	1 channel
	Connector	BNC

Table 1-4 (2/3)

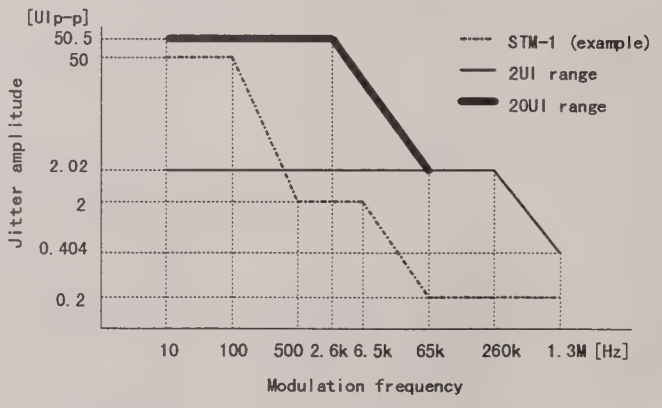
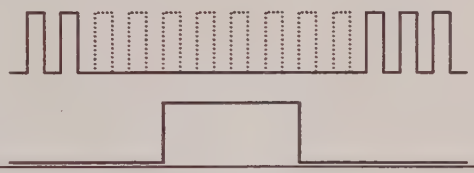
Item		Specifications
Alarm detection		Input clock loss, PLL Unlock
Jitter *1	Setting	
	Jitter	Can be turned on/off. (only 1MHz＜clock output frequency≦200MHz)
	Range	2UI/50UI Clock output SSB phase noise 2UI range: -85dBc/Hz or less (10kHz offset) 50UI range: -70dBc/Hz or less (10kHz offset)
	External modulation input	
	Modulation frequency	10 Hz ≦ f ≦ 1.3 MHz (2UI range) 10 Hz ≦ f ≦ 65 kHz (50UI range)
	Waveform	Sine wave
	Voltage variation range	-1 V to +1 V
	Termination condition	75 ohm to GND
	Number of inputs	1 channel
	Connector	BNC
	Modulation degree	
	Display range	0.000 UIp-p to 2.020 UIp-p (2UI range) 0.00 UIp-p to 50.50 UIp-p (50UI range)
	Accuracy	Available (100MHz ＜ f ≦ 200MHz) ±5% ±0.05 UIp-p (2UI range) ±5% ±0.5 UIp-p (50UI range)
	Amplitude characteristic	 Available (100MHz ＜ f ≦ 200MHz)
	Jitter reference output	
	Frequency range	1MHz to 200 MHz
	Level	1 Vp-p ± 20% (AC)
	Termination condition	50 ohm to GND
	Number of outputs	1 channel
	Connector	SMA

Table 1-4 Specifications (3/3)

Item		Specifications
Clock reset	Reset output Level Termination condition Number of outputs Connector Clock gating and reset output timings	 ECL V_{OH} : -0.9±0.2 V V_{OL} : -1.7±0.2 V 50 ohm to -2V 2 channel SMA 
	External arming input Level Connector Logic Pulse width	 V_{IH} : 0 ±0.2 V V_{IL} : -1 ±0.2 V BNC Reset output generated at rising edge. 10ns>
Operation temperature range		5℃ to 40℃
Dimensions and weight Dimensions Weight		 370±5(D) 232±4(W) 47.6±2.8(H) (mm) Max. 2.5 k g (When OPT01 is not installed.) Max. 3.0 k g (When OPT01 is installed.)
Power supply Power consumption		 Max. 60 VA

*1 : Enabled when an OPT01 is installed.

CHAPTER 2 PREPARATIONS

2.1 Precautions

Environmental Conditions of Installation Site

This unit operates normally at an ambient temperatures of 5℃ to 40℃ and ambient humidity of 85% or less. This unit must be stored in an environment where the temperature is -20℃ to 60℃ and the humidity does not exceed 85%. Do not use or store this unit in a location exposed to:

1. Strong vibration
2. Heavy dust
3. Direct sunlight
4. Active gases
5. Water splashes
6. Oxidization

⚠ CAUTION

Using this unit at room temperatures after leaving it in at low temperatures for a long period could cause the internal circuits to short because of condensation. To avoid this, use the unit after condensation has been allowed to dry.

2.2 Safety Precautions

⚠ WARNING

Do not replace the plug-in units by users themselves. Replacement is performed by Anritsu service department. Contact your dealer or Anritsu sales office. There is a possibility to make a electric shock accident reaching a death or injury.

To assure safety and prevent damages to this unit, follow the precautions given below.

⚠ CAUTION

1. This unit has been developed only for use with the MP1630A/B Digital Data Analyzer. Using this unit inserted in any equipment other than the MP1630A/B could result in damage or accident.
2. When inputting signals, do not apply excessive voltages to the internal circuits because this could cause the internal circuit to break.
3. Before connecting any other equipment to this unit, be sure to check the input/output levels.
4. The clock output is terminated at -1.3 V by a 50-ohm resistor. Other outputs such as an ECL output must be terminated at -1.3 V by a 50-ohm resistor.
5. Before connecting other equipment (including experimental circuits) to the input/output connectors, be sure to set up a ground to prevent static damage.
6. The outer conductor and core wires of a coaxial cable may be charged like a capacitor. Use a core cable after discharging electrons using a metallic object.

CHAPTER 3 EXPLANATION OF CONNECTOR PANEL

3.1 Explanation of Connector Panel

This section shows the appearance of the connector panel (back panel) of this unit and explains the connectors on it (when options 01 is used).

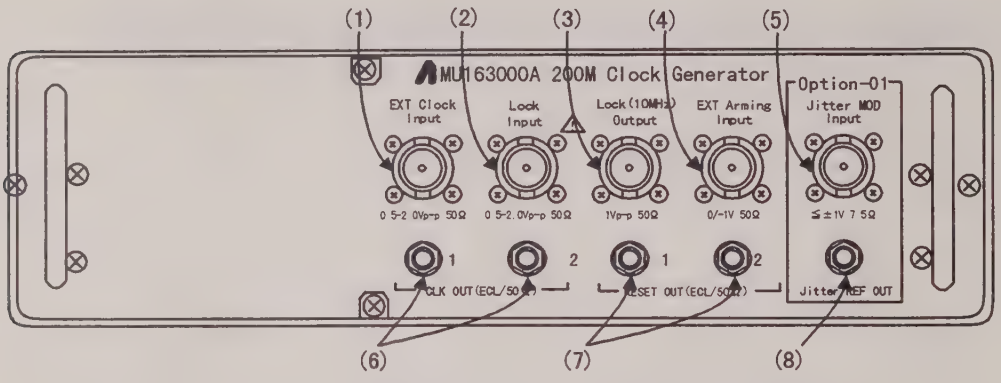


Figure 3-1 Connector panel (back panel of MU163000A)

Table 3-1 Connectors

No.	Label	Name	Description
1	EXT Clock Input	External clock input connector	Receives a clock signal when the external clock is operating.
2	Lock Input	Reference clock input connector	Used to synchronize an external 64kHz or 10MHz reference signal with the clock of this unit.
3	Lock(10MHz) Output	Reference clock output connector	Outputs 10MHz reference clock pulses to synchronize the clock of external equipment with the clock of this unit.
4	EXT Arming Input	External arming input connector	Receives an external signal for arming
5	Jitter MOD Input	External modulation input connector	Receives an external signal for jitter modulation (when a option 01 is installed)
6	CLK OUT (ECL/50ohm)	Clock output connector	Outputs the clock signal generated by this unit or a clock signal input from external equipment.
7	RESET OUT (ECL/50ohm)	Reset output connector	Outputs a Reset signal for synchronizing patterns of two PPG units with each other
8	Jitter REF OUT	Jitter reference output connector	Outputs a no-modulation clock (when a option 01 is installed).

3.2 Connection between Units

This section explains how to connect this unit to another unit inserted in the MP1630A/B main unit.

- **Connection (1)**
  Slot1 : MU163000A 200M clock generator
  Slot3 : MU163020A/B 200M 16CH pulse pattern generator
  Slot4 : MU163040A/B 200M 16CH error detector
  Cable: SMA cable

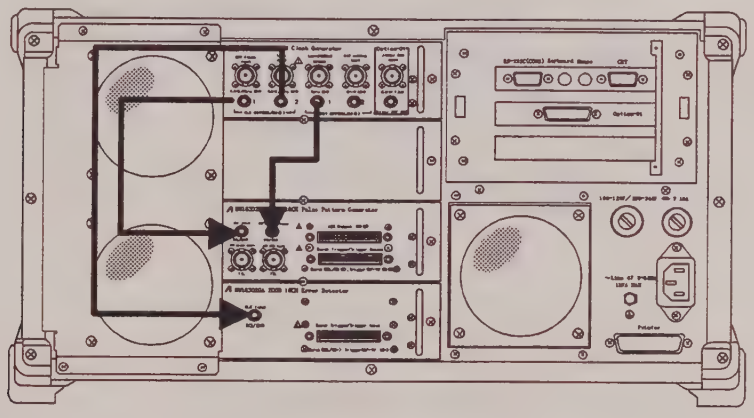


Figure 3-2 Connection between Units (1)

3.3 Connection with External Equipment

This section explains how to connect this unit to external equipment.

- **Connection (1) (Signal input from external equipment)**
  Cable: BNC cable

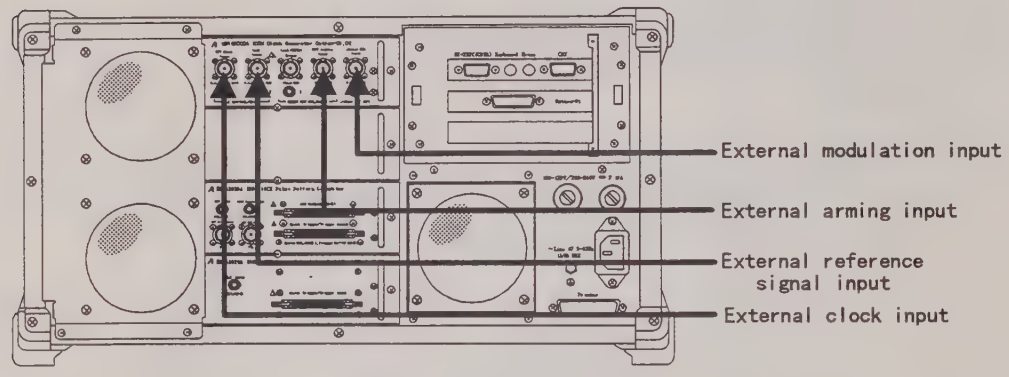


Figure 3-3 Connection with External Equipment (1)

- **Connection (2) (Signal output to external equipment)**
  Cable: (1) BNC cable
  (2) SMA cable

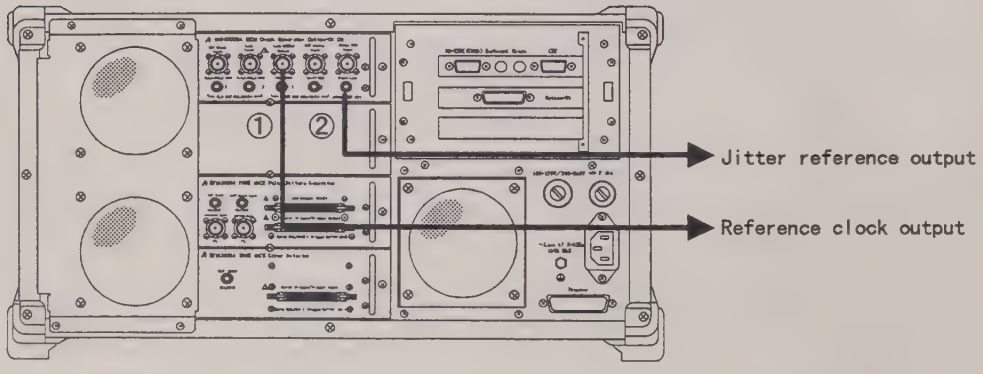


Figure 3-4 Connection with External Equipment (2)

CHAPTER 4 EXPLANATION OF SCREENS

4.1 Screen Configuration

When this unit, PPG (Pulse Pattern Generator), and ED (Error Detector) are inserted in the slots in the MP1630A/B, subwindows and panels are hierarchically structured as shown below. For descriptions of the shaded displays in the table below, refer to the MP1630A/B operation manual or MU163020A/B 200M 16CH Pulse Pattern Generator & MU163040A/B 200M 16CH Error Detector operation manual.

Table 4-1 Hierarchical structure of screens

Subwindow	Panel	Setting item
System	System	Allows you to set a date, time, remote function, and system operation mode.
	Option	Displays the configuration of the units inserted in the MP1630A/B.
Setup	Setup	Allows you to make basic settings.
	Frequency	Allows you to set a frequency, arming (option), and jitter (option).
	Clock I/F	Allows you to set the clock input/output interface.
	Data I/F	Allows you to set the data input/output interface.
	Pattern	Allows you to set a send/receive pattern, burst, and synchronization.
	AUX I/F	Allows you to set the AUX output (envelope resetting).
	Trigger I/F	Allows you to set trigger and synchronous input/output signals.
Test Menu	Measurement	Allows you to set measurement conditions.
	Error Addition	Allows you to set the conditions for error addition and delay measurement pattern insertion.
	Analyze	Allows you to set the conditions for setting the analysis function.
Result	Error/Alarm	Displays the error/alarm measurement result and allows you to start/stop measurement.
	Eye Margin	Displays the eye margin measurement result and allows you to start/stop measurement.
	Delay(Mode1)	Displays the delay (Mode 1) measurement result and allows you to start/stop measurement.
	Delay(Mode2)	Displays the delay (Mode 2) measurement result and allows you to start/stop measurement.
Analyze	Trace Text	Displays an error/alarm measurement data analyze text.
	Trace Graph	Displays an error/alarm measurement data analyze graph.
	Recall Text	Opens and displays an analyze text.
	Recall Graph	Opens and displays an analyze graph.
Customize		Displays the setting & error measurement result (allows you to select items and set values directly).

CHAPTER 5 OPERATION

5.1 Setting a Frequency

This unit can generate clock pulses within the frequency range of 10 kHz to 200 MHz. Let us take a look at how to make the following settings:

- Clock source
- Reference signal
- Frequency

1. Open the Setup:Frequency panel.

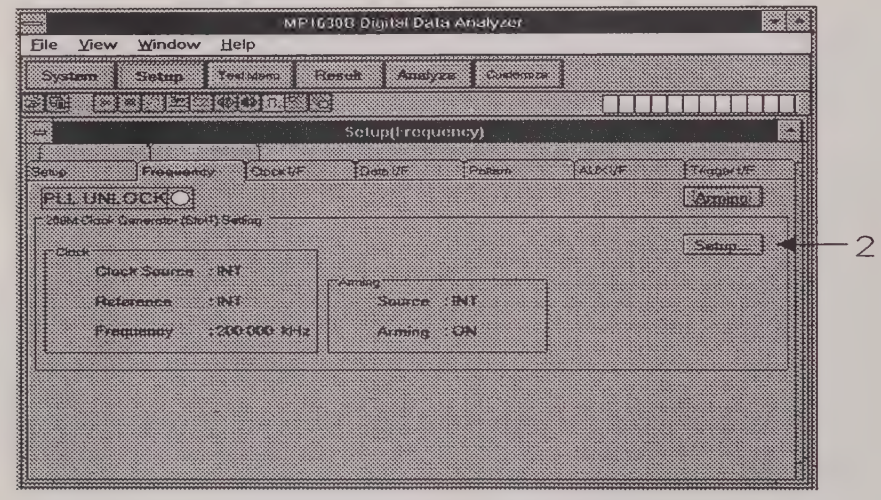


Figure 5-1 Setup:Frequency panel

2. Click the Setup button in the 200M Clock Generator (Slot1) Setting group box on the Setup:Frequency panel. The 200M Clock Generator (Slot1) dialog box will open.

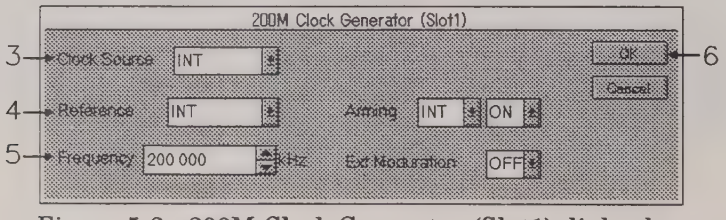


Figure 5-2 200M Clock Generator (Slot1) dialog box

3. Set whether clock pulses are to be generated internally or an external clock is to be used by selecting INT or EXT from the drop-down list box.

INT	Generate clock pulses internally.
EXT	Use an external clock

4. When you have selected internal generation of clock pulses, set whether an internal or external reference signal is to be used by selecting a reference signal type from the Reference drop-down list box.

INT	Use an internal reference signal.
EXT 10MHz	Use an external reference signal (10 MHz).
EXT 64kHz	Use an external reference signal (64 kHz).

5. When you have selected internal generation of clock pulses, select a clock frequency from the Frequency spin box. The setting resolution varies with the frequency band.

10 kHz to 200000 kHz
- 10.0 kHz to 1000.0 kHz (in 0.1kHz steps)
- 1000 kHz to 200000 kHz (in 1kHz steps)

6. This completes the frequency setting. Click the OK button to make the new setting effective.

5.2 Monitoring the System Error

This unit monitors the following two types of alarms:

- PLL Unlock

  This alarm indicates that the PLL loop has been unlocked.

  This alarm can be detected when clock pulses are generated internally.

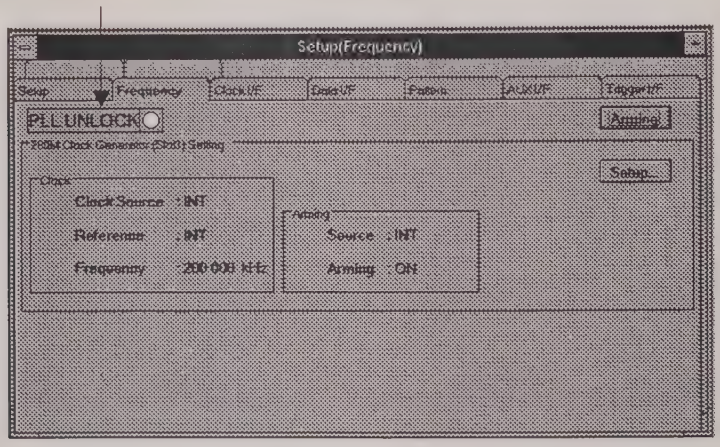


Fig 5-3 Setup:Frequency panel(PLL Unlock)

- EXT Clock Loss

  This alarm indicates that there is no signal received from the outside.

  This alarm is detected when clock pulses are generated using an external clock.

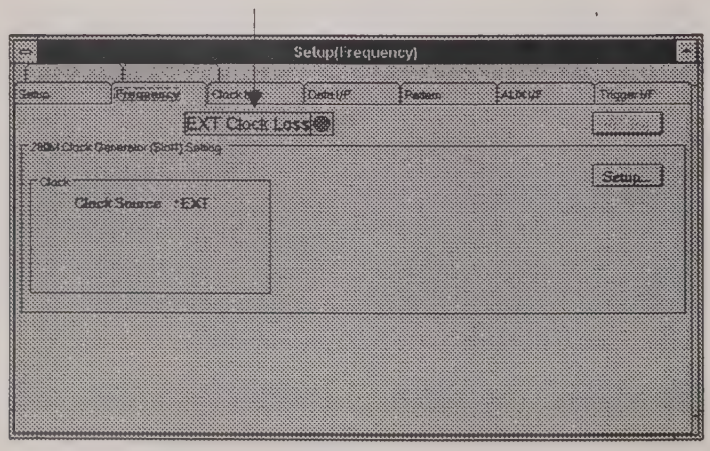


Figure 5-4 Setup: Frequency panel

You can set the MP1630A/B to allow it to sound a system error buzzer when a PLL Unlock or EXT Clock Loss alarm occurs. For more buzzer setting details refer to section6.6 "Setting Buzzer" of the MP1630A/B operation manual.

5.3 Setting Jitter

5.3.1 Setting jitter modulation

When a jitter option (OPT01) is installed, this unit can perform jitter modulation for clock pulses using an external signal source. Let us take a look at the procedure for setting jitter modulation.

1. Open the Setup: Frequency panel.

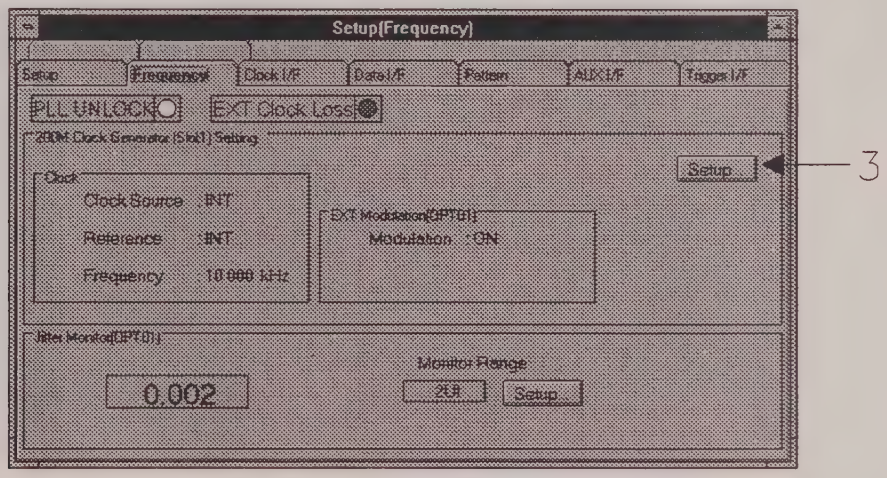


Figure 5-5 Setup: Frequency panel

2. Select internal generation of clock pulses and set a clock frequency. (For the setting procedure, see section5.1 "Setting a Frequency".) When an external clock source is selected, the jitter modulation function cannot be used.

3. Click the Setup button in the 200M Clock Generator (Slot1) Setting group box on the Frequency panel. The 200M Clock Generator (Slot1) dialog box will open.

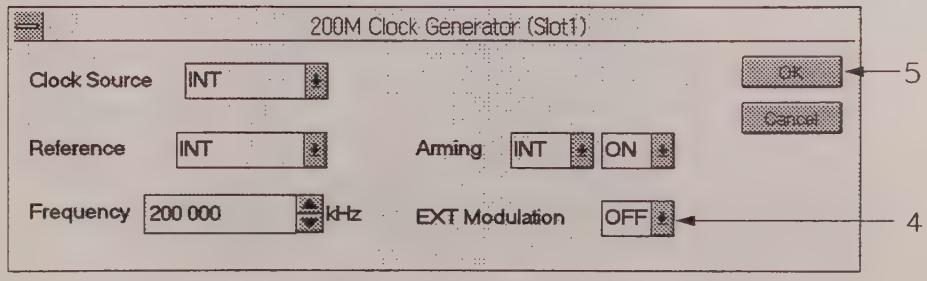


Figure 5-6 200M Clock Generator (Slot1) dialog box

4. Set whether the jitter modulation function is to be turned on or off using the EXT Modulation drop-down list box.

OFF	Do not perform jitter modulation.
ON	Perform jitter modulation.

Note

It is an impossible to modulate a jitter when clock frequency is less then 1000kHz. Therefore, the setting became a condition cannot be change.

5. This completes the jitter setting. Click the OK button to make the new setting effective.

5.3.2 Setting the jitter monitor

When a jitter option (OPT01) is installed, this unit allows the jitter quantity to be monitored. This section describes the jitter monitor calibration and range setting.

1. Open the Setup:Frequency panel.

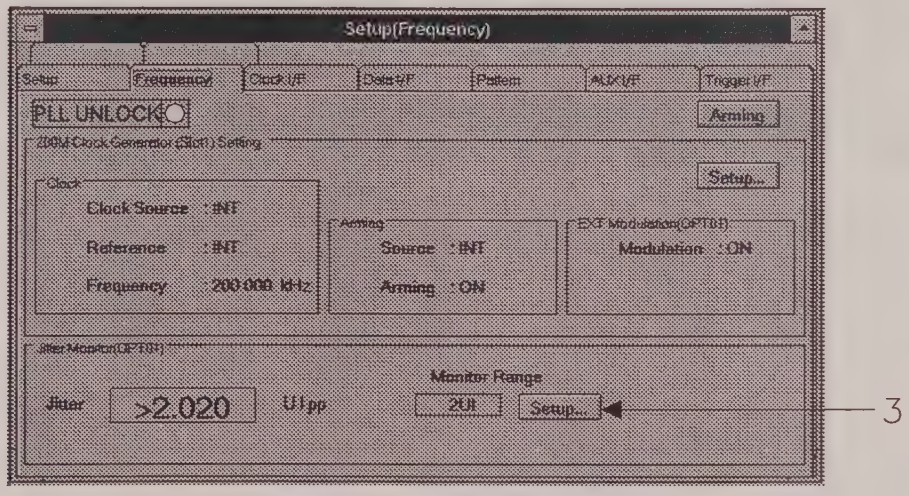


Figure 5-7 Setup: Frequency panel

2. Select internal generation of clock pulses and set a clock frequency. (For the setting procedure, see section5.1 "Setting a Frequency".) When an external clock source is selected, the jitter modulation function cannot be used.

3. Select a jitter monitor range. Click the Setup button under the Monitor Range label in the Jitter Monitor (OPT1) group. The Monitor Range dialog box will open.

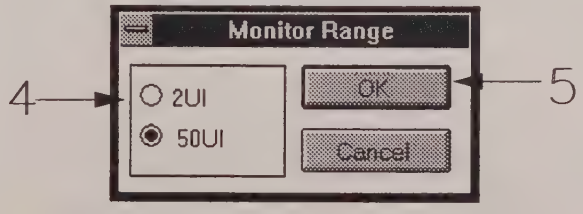


Figure 5-8 Monitor Range dialog box

4. Select a jitter monitor range with an option button.

2UI	Set the 2UI range.
50UI	Set the 50UI range.

5. This completes the jitter monitor setting. Click the OK button to make the new setting effective.

6. The jitter quantity is displayed in the Jitter Monitor(OPT01) group box. The range of the displayed jitter quantity is as follows:

0.000 to 2.020 UIp-p	when the 2UI range is selected
0.00 to 50.50 UIp-p	when the 50UI range is selected

5.4 For the Users of the Existing BERTS

5.4.1 Customize subwindow

The Customize subwindow is a setup screen that adopts the 1-key/1-parameter operation method of the existing BERTS, allowing you to monitor the measurement result by inputting measurement parameters directly. The screen consists of a total of eight frames: six Setup frames, a Result frame, and a Pattern Edit frame. The user can freely assign setting items to these frames, so only one screen is required to perform all operations necessary to carry out measurements. For example, using the Customize subwindow allows you to measure an error rate with the clock frequency changed continuously.

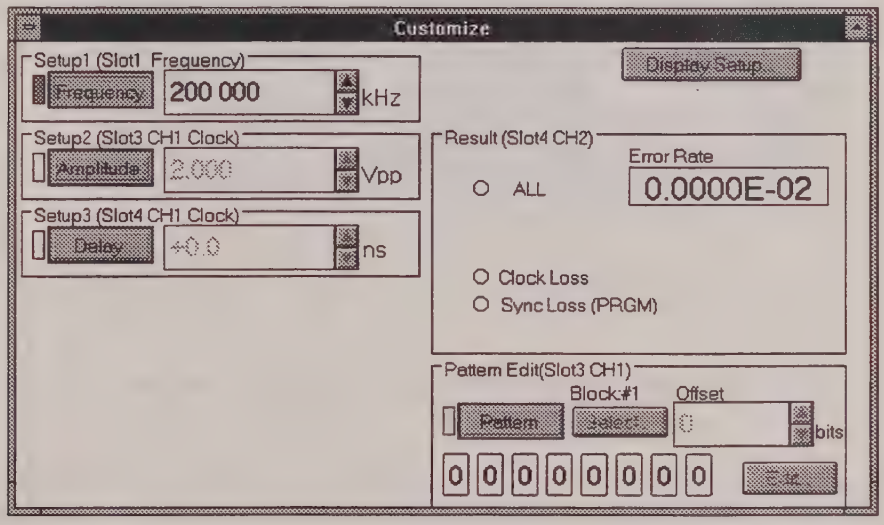


Figure 5-11 Customize subwindow

To change a setting, click the button in the associated frame. The LED on the left of the button will light to indicate that setting is enabled. When the button is pressed again, the LED goes off to indicate that setting is disabled. Of all frames of the Customize subwindow, only one frame can be used at a time to make settings. Table 5-1 lists the setting items that can be assigned to the six Setup frames of the Customize subwindow.

Table 5-1 Setup Setting items that can be assigned to Setup frames

Setting items related to MU163000A (200M Clock Generator)	
Frequency	
Setting items related to PPG/ED (example)	
Clock output/input interface	Amplitude、Offset、Delay、Polarity
Data output/input interface	Amplitude、Threshold、Offset、Skew
Trigger output interface	Burst Trigger の Output Delay
Send pattern	Mark Ratio、Logic

For details on the settings related to the PPG/ED, refer to the MU163020A/B 200M 16CH Pulse Pattern Generator & MU163040A/B 200M 16CH Error Detector operation manual

5.4.2 Assigning setting items to Setup frames

This section explains the procedure for assigning setting items to Setup frames. A maximum of six items can be assigned.

1. Click the Display Setup button in the Customize subwindow. The Customize Window Display Setup dialog box will open.

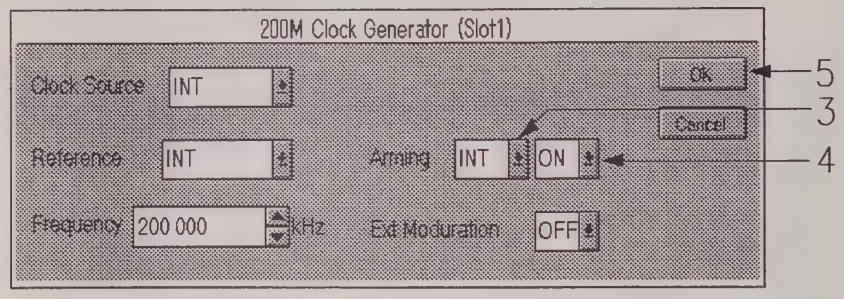


Figure 5-12 Customize Window Display Setup dialog box

2. Select a frame to which a setting item is to be assigned. Click a tab (Setup1 to Setup6) to open a desired panel.

3. When multiple units are used in combination, select the target unit from the Unit drop-down list box. When it is not necessary to assign any setting item, select OFF.

Note

For the setting item assignment procedure to be followed when a unit other than the 200M Clock Generator is selected, refer to the instruction manual that comes with the selected unit.

4. Select a setting item from the Item drop-down list box (1). For the selectable setting items, see Table 5-1 Here, you can select only Frequency.

5. After selecting the setting item, Click the OK button.

5.5 Saving and Opening the Setting Data

5.5.1 Saving the Setting Data

This section explains how to save the unit setting data on a floppy disk or hard disk.

1. Select [File]-[Save] from the parent window menu bar. The Save dialog box will open.

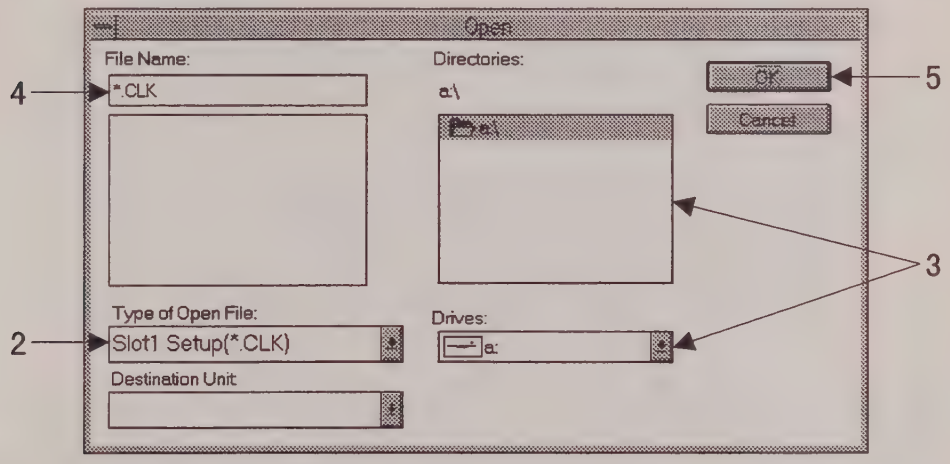


Figure 5-13 Save dialog box

2. Select the type of file to save from the Type of Save File dropdown list box.

Mainframe Setup(*.FRM)	Save the MP1630A/B mainframe setting data.
Slot1 Setup(*.CLK)	Save the setting data on the unit (200 MHz Clock Generator) inserted in slot 1

3. Using the Directories and Drives controls, select the directory and drive in which to save a file.

Note

While this instrument supports two hard disk drives C and D, drive D is dedicated to virtual memory and is not accessible to users. Drive C would not be available for saving data, either, when system operations have been set in the measurement power fail mode. For more details on system operations, refer to the MP1630A/B operation manual

4. Type the filename of the file to save in the File Name text box with eight or fewer characters.
5. The setup procedure is now complete. Click OK to save the data. The character string corresponding to the type of the file selected from the Type of Save File box is used as the file name extension.

Note

Setting data can also be saved by selecting [File]-[Quick Save] from the menu bar. Selecting Quick Save allows you to save the setting data on the MP1630A/B and the setting data on all the inserted units at the same time.

5.5.2 Opening the Setting Data

This section explains how to open the unit setting data saved on a floppy disk or hard disk.

1. Select [File]-[Open] from the parent window menu bar. The Open dialog box will open.

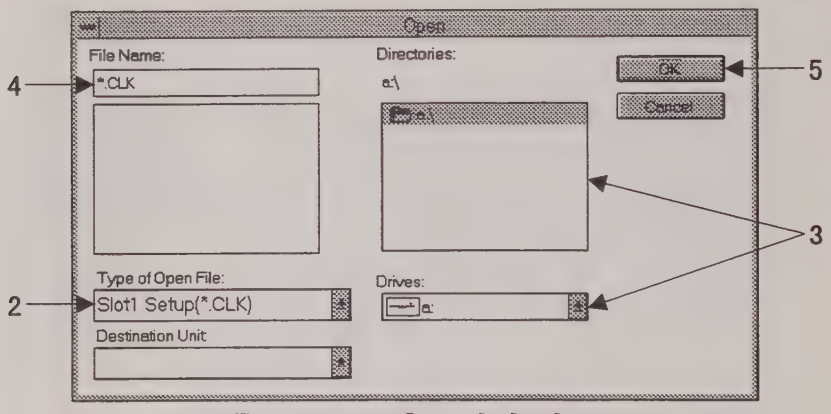


Figure 5-14 Open dialog box

2. Select the type of file to open from the Type of Open File dropdown list box.

Mainframe Setup(*.FRM)	Open the MP1630A/B mainframe setting data.
Slot1 Setup(*.CLK)	Open the setting data of the unit (200 MHz Clock Generator) inserted in slot 1

3. Using the Directories and Drives controls, select the directory and drive in which the file to open is stored.

Note

Drive D cannot be selected.

4. Select the filename of the file to open from the File Name list box.
5. The setup procedure is now complete. Click OK to open the data.

Note

Setting data can also be opened by selecting [File]-[Quick Open] from the menu bar. Selecting Quick Open allows you to open the setting data on the MP1630A/B and the setting data on all the inserted units at the same time.

5.6 Synchronizing Patterns of PPG Unit

This unit can synchronize patterns of two PPG unit which are inserted in two MP1630B main frame individually. The setting procedure is described below. (For details on arming, see "Terminology" on the next page.)

1. Open the Setup:Frequency panel.

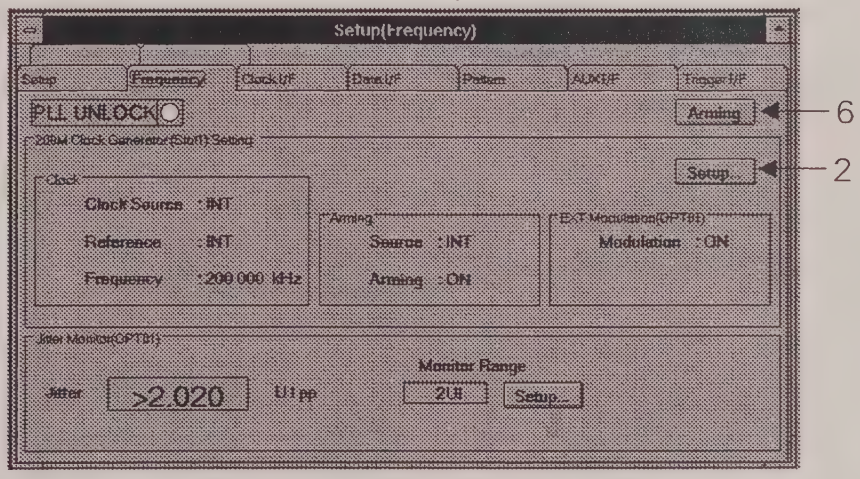


Figure 5-9 Setup: Frequency panel

2. Click the Setup button in the Clock Generator(Slot1) Setting group box. The 200M Clock Generator(Slot1) dialog box will open.

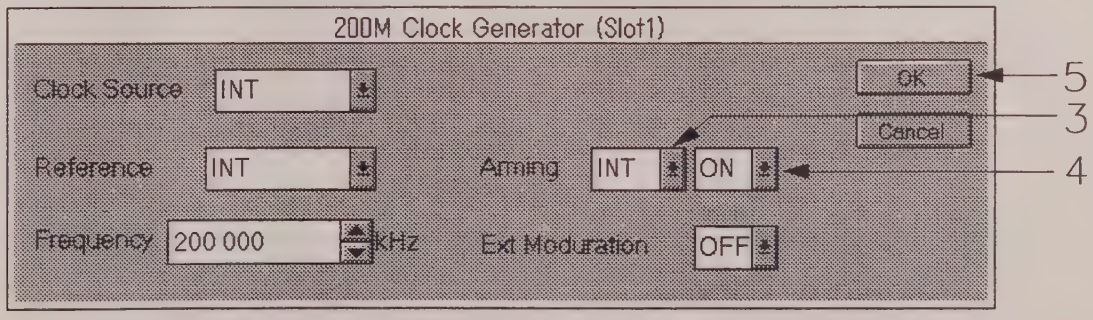


Figure 5-10 200M Clock Generator(Slot1) dialog box

3. Select an Arming signal source from the Arming drop-down list (on the left side). A clock reset signal is generated with reference to the arming signal, synchronizing the patterns of two PPG units with each other.

INT	Use an internal signal.
EXT	Use an external signal.

Note

The external arming signal works normally under the following conditions:

Repetitive frequency	Set frequency/10
Pulse duration	10 ns or more
Polarity	Rising edge

4. When you have selected an internal arming signal source, determine whether the arming signal generation function is to be turned on/off. Use the Arming drop-down list (on the right side).

OFF	Turn off the arming signal generation function.
ON	Turn on the arming signal generation function.

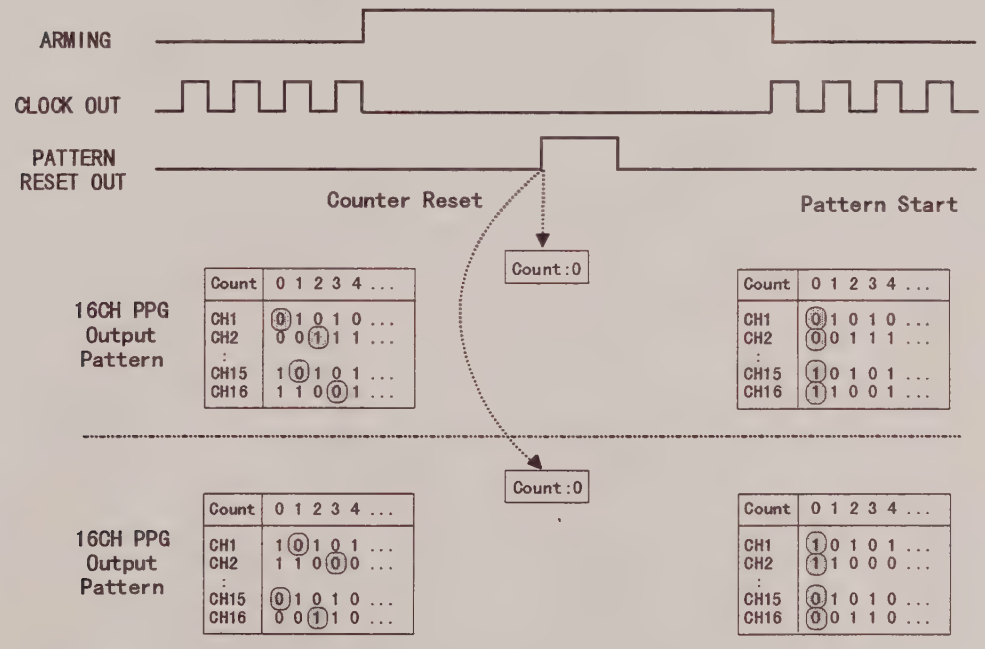
5. This completes the setting. Click the OK button to make the new setting effective.

6. When you have selected an internal arming signal source and turned on the arming signal generation function, set the arming signal generation timing. Click the Arming button on the panel. Then, the patterns of the two PPG units will be synchronized with each other based on the set timing.

Terminology

The purpose of the arming function is to synchronize patterns of two PPG unit which are inserted in two MP1630B main frame individually.

The CG stops outputting clock pulses with reference to the external or internal arming signal and outputs a Pattern Reset signal as shown below. Upon receipt of a Pattern Reset signal, the PPG units reset the current pattern counter value and start outputting patterns from the beginning. (In the figure below, it is assumed that the patterns of both PPG units are PRGM patterns and the pattern lengths of all channels are the same. The shaded portions indicate the currently output patterns.)



Note

When you use Arming function between the PPG unit which are inserted in two MP1630B main frame individually, it is necessary that two cable length of[below which connect from one PPG unit to a CG unit and from the other PPG unit to a CG unit are the same within one meter.

1) CG unit (CLK OUT) ← → PPG unit (CLK Input)

2) CG unit (RESET OUT) ← → PPG unit (PATT Reset Input)

6

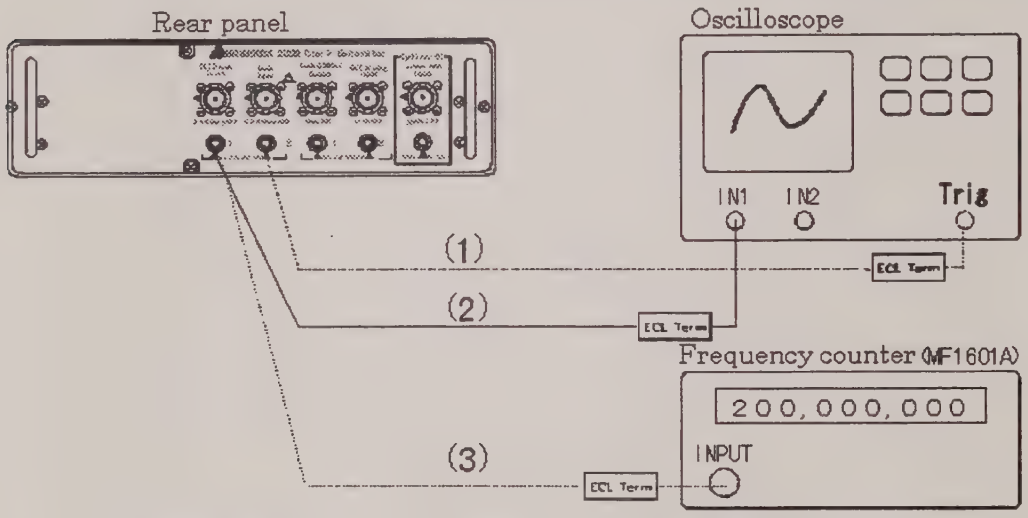
CHAPTER 6 PERFORMANCE TEST

6.1 Clock signal test

This section describes the procedures for checking the main function of the unit. Some equipment in below figures is required for this performance test.

6.1.1 Internal clock test

1. To test waveform and frequency of the internal clock output signal, connect equipment as Fig 6-1.



(1) Connect the CLK OUT to the trigger input of a oscilloscope.
(2) Connect the CLK OUT to the signal input of a oscilloscope.
(3) Connect the CLK OUT to the input of a frequency counter.

Fig 6-1 Connection for the internal clock output test

⚠ CAUTION

Use proper ECL terminator (50 ohm to -1.3V) to input level of the oscilloscope and frequency counter you use. There is a risk of damage to equipment.

2. Make settings on the Setup:Frequency Panel as following.
   - Settings of Clock Source : Select "INT"
   - Settings of Reference : Select "INT"
   - Settings of Frequency : Input "200 000 kHz"
3. Confirm that the frequency value measured by the frequency counter ranges 200MHz± 400Hz

4. Confirm that the amplitude of the waveform measured by the sampling oscilloscope is in the range shown as Fig 6-2.

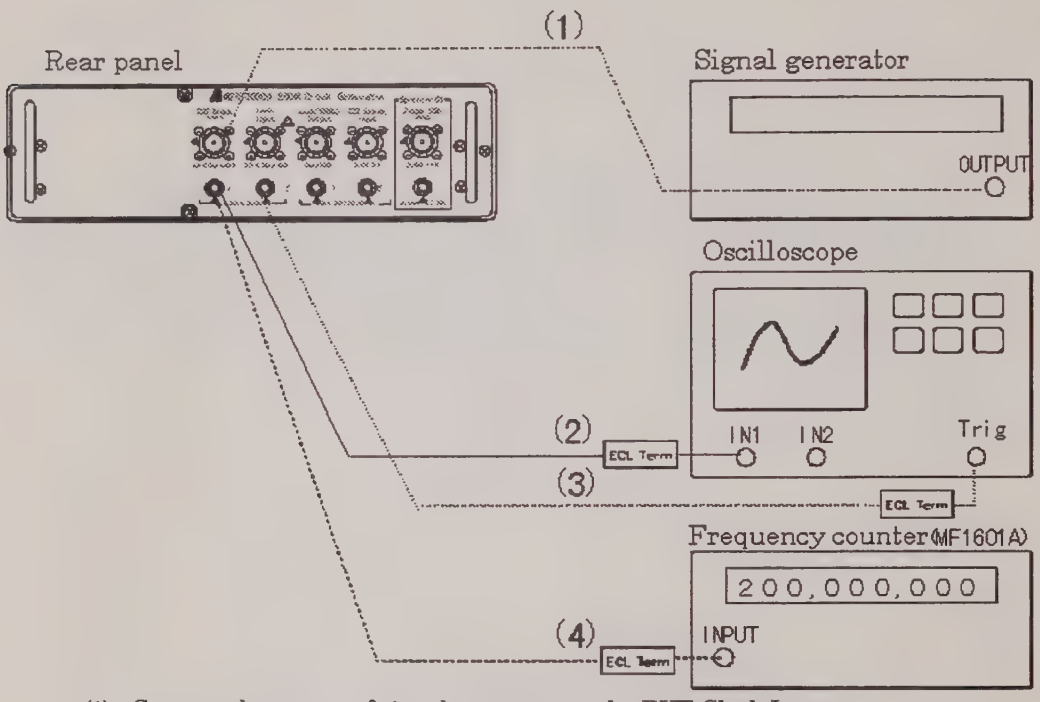
Fig 6-2 Specification of the clock output signal waveform

5. Change Frequency on the Setup:Frequency to "100 001 kHz" and "10.0kHz" , and test in the same way as procedure 3 and 4. The specification under each frequency is shown below.

Frequency "100 001kHz" : 100 001kHz±200.002Hz
Frequency "10kHz" : 10kHz±0.02Hz

6.1.2 External clock test

1. To test waveform and frequency of the external clock signal output connect equipment as Fig 6-3.



(1) Connect the output of signal generator to the EXT Clock Input.
(2) Connect the CLK OUT to the input of the oscilloscope.
(3) Connect the CLK OUT to the trigger of the oscilloscope.
(4) Connect the CLK OUT to the input of a frequency counter.

Fig 6-3 Connection for the external clock test

⚠ CAUTION

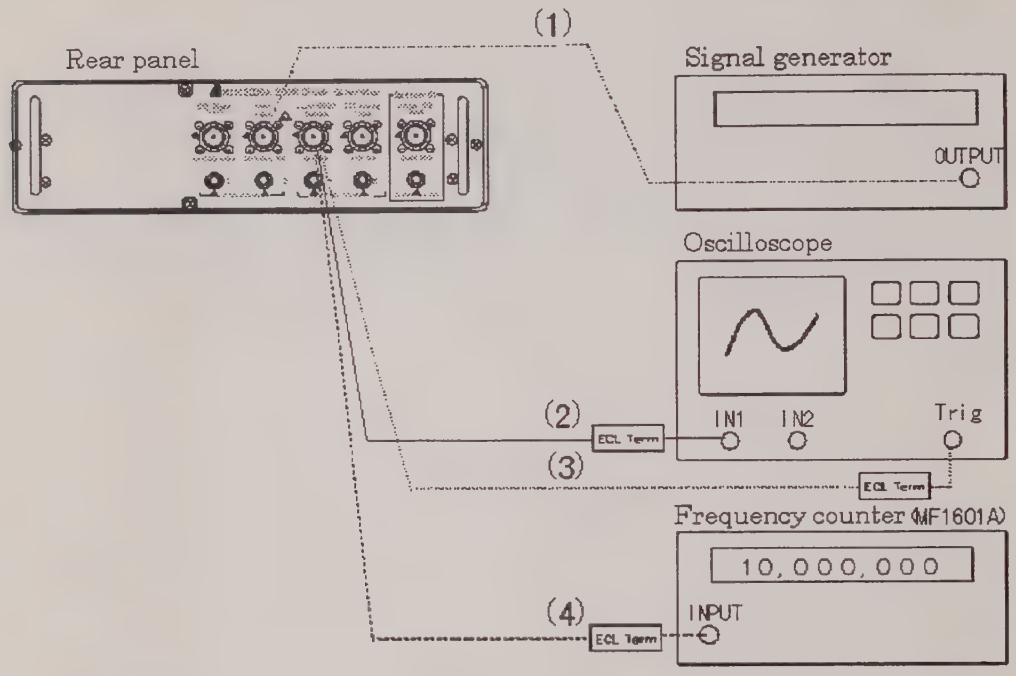
Use proper ECL terminator to input level of the oscilloscope and frequency counter you use. And don't apply voltage lower than -4.0V or higher than +4.0V to the EXT Clock Input. To avoid that use proper attenuators. There is a risk of damage to equipment.

2. Select "EXT" to the settings of Clock Source on the Setup:Frequency panel.
3. Set the level of the signal generator output to 0.5Vp-p and frequency to 200MHz.
4. Confirm that the frequency value measured by the frequency counter is 200MHz in the range according to accuracy of the signal generator you use.

5. Confirm that the amplitude of the waveform measured by the sampling oscilloscope is in the range shown as Fig 6-2.
6. Set the level of the signal generator output to 2.0Vp-p and frequency to 10kHz.
7. Confirm that the frequency value measured by the frequency counter is 10kHz in the range according to accuracy of the signal generator you use.
8. Confirm that the amplitude of the waveform measured by the sampling oscilloscope is in the range shown as Fig 6-2.

6.1.3 Lock output test

1. To test waveform and frequency of the lock output signal, connect equipment as Fig 6-4.



(1) Connect the output of signal generator to the Lock Input.
(2) Connect the Lock Output to the input of the oscilloscope.
(3) Connect the Lock Output to the trigger of the oscilloscope.
(4) Connect the Lock Output to the input of a frequency counter.

Fig 6-4 Connection for the Lock output test

⚠ CAUTION

Don't apply voltage lower than -2.0V or higher than +2.0V to the Lock Input. To avoid that use proper attenuators. There is a risk of damage to equipment.

2. Make settings on the Setup:Frequency panel as follow.
   - The settings of Clock Source : Select "INT"
   - The settings of Reference : Select "INT"
3. Confirm that the frequency value measured by the frequency counter ranges 10MHz±20Hz.

4. Confirm that the amplitude of the waveform measured by the sampling oscilloscope is in the range shown as Fig 6-5.

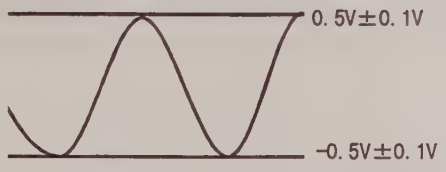


Fig 6-5 Specification of the Lock output waveform

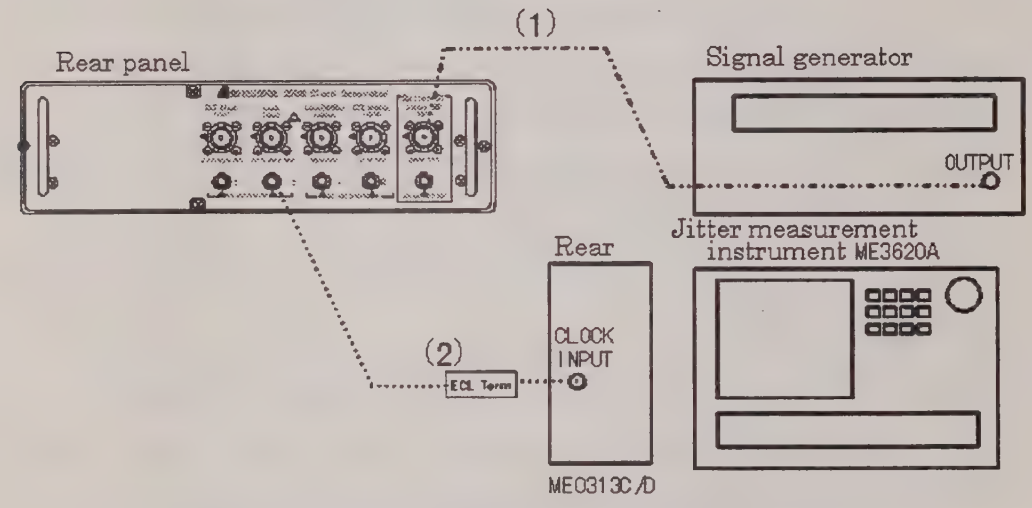
5. Select "EXT 10MHz" to the settings of Reference on the Setup: Frequency Panel.
6. Set the level of the signal generator output to 0.5Vp-p and frequency to 10MHz.
7. Confirm that the frequency value measured by the frequency counter is 10MHz in the range according to accuracy of the signal generator you use.
8. Confirm that the amplitude of the waveform measured by the sampling oscilloscope is in the range shown as Fig.6-5.
9. Select "EXT 64kHz" to the settings of Reference on the Setup : Frequency Panel.
10. Set the level of the signal generator output to 2.0Vp-p and frequency to 64kHz.
11. Confirm that the frequency value measured by the frequency counter is 10MHz in the range according to accuracy of the signal generator you use.
12. Confirm that the amplitude of the waveform measured by the sampling oscilloscope is in the range shown as Fig 6-5.

6.2 Jitter modulation test

This section describes how to test a jitter ,modulation performance on the assumption that the unit is slot in jitter addition (option 01). Explain the example using theME3620A SDH/SONET Analyzer slot in jitter measurement option on the jitter measurement instrument.

(Test of range 2UI)

1. Connect equipment as Fig 6-6.



(1) Connect the output of signal generator to the Jitter MOD Input.
(2) Connect the CLK OUT to the Jitter measurement unit ME0313C/D of the ME3620A.

Fig 6-6 Connection for the jitter modulation test (Range 2UI)

⚠ CAUTION

Use proper ECL terminator to input level of the ME3620A you use. And don't apply voltage lower than -1.0V or higher than +1.0V to the Jitter MOD Input. To avoid that use proper attenuators. There is a risk of damage to equipment.

2. After select Initialize from the File menu in the main window, make settings on the Setup:Frequency panel as follow.
   - Select "ON" on the settings of the EXT Modulation.
   - Select "2UI" on the Monitor Range.
   - Select 155,520 kHz on the settings of Frequency.
3. Make the sine wave from the signal generator that frequency is 10Hz.

4. Control output level of signal generator as jitter measurement result in ME3620A indicates 2.02Uip-p.
5. Confirm that the jitter monitor value displayed on the Setup:Frequency panel is in the range of 2.02UIp-p±0.151UIp-p.
6. Make the sine wave from the signal generator that frequency is 260kHz.
7. Control output level of signal generator as jitter measurement result in ME3620A indicates 2.02Uip-p.
8. Confirm that the jitter monitor value displayed on the Setup:Frequency panel is in the range of 2.02UIp-p±0.151UIp-p.
9. Make the sine wave from the signal generator that frequency is 1.3MHz.
10. Control output level of signal generator as jitter measurement result in ME3620A indicates 0.404UIp-p.
11. Confirm that the jitter monitor value displayed on the Setup:Frequency panel is in the range of 0.404UIp-p±0.0702UIp-p.

(Test of range 50UI)

1. Connect equipment as Fig 6-7

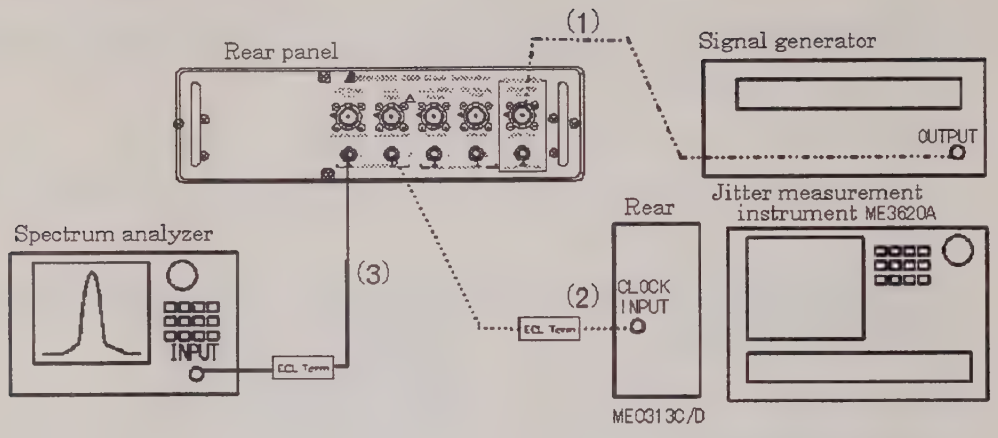


Fig 6-7 Connection for jitter modulation test (range 50UI)

⚠ CAUTION

Use proper ECL terminator to input level of the ME3620A you use. And don't apply voltage lower than -1.0V or higher than +1.0V to the Jitter MOD Input. To avoid that use proper attenuators. There is a risk of damage to equipment.

2. After select Initialize from the File menu in the main window, make settings on the Setup:Frequency panel as follow.

   - Select "ON" on the settings of the EXT Modulation.
   - Select "50UI" on the Monitor Range.
   - Select 19,440 kHz on the settings of the Frequency.

   Note

   19,440kHz clock is made by dividing 155,520kHz clock into eight in the MU16300A. Consequently a jitter value displayed on the jitter monitor is equivalent to one-eighth of a case of 155,520kHz.

3. Make the sine wave from the signal generator that frequency is 10Hz.
4. Observing a Spectrum Analyzer, control the output level of signal generator get as a position of the sixth Bessel NULL(conveyance wave)
5. Confirm the jitter monitor value displayed on the Setup:Frequency panel is in the range of 5.752UIp-p±0.7876UIp-p.

6. Make the sine wave from the signal generator that frequency is 2.6kHz.
7. Observing the Spectrum Analyzer, control the output level of signal generator get as a position of the sixth Bessel NULL (conveyance wave).
8. Confirm the jitter monitor value displayed on the Setup:Frequency panel is in the range of 5.752UIp-p±0.7876UIp-p.
9. Set 155,520kHz to the settings of Frequency on the Setup:Frequency panel.
10. Make the sine wave from the signal generator that frequency is 65kHz.
11. Control output level of signal generator as jitter measurement result in ME3620A indicates 2.02Uip-p.
12. Confirm the jitter monitor value displayed on the Setup:Frequency panel is in the range of 2.02UIp-p±0.601UIp-p.

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7

CHAPTER 7 MAINTENANCE

7.1 Daily Care

- To remove surface smears from the instrument, wipe with a cloth moistened with a weak neutral detergent solution.
- If dirt or dust collects on the instrument, suck with a vacuum cleaner.
- If parts, such as screws, get loose, retighten them using a specified tool.

7.2 Storage Notes

Pay attention of following points when storing the instrument for long time.

1. Remove surface dirt, smears, and other foreign before storing the instrument.
2. Avoid storing the instrument at +60℃ or higher or -20℃ or lower, or at relative humidities of 85% or higher.
3. Avoid storing the instrument in places that are exposed to direct sunlight or that are dusty.
4. Avoid storing the instrument in places where drops of water may collect on it or it may be affected by active gases.
5. Avoid storing the instrument in places that are liable to oxidation or subject to violent vibration.

- Recommended long-term storage conditions

The instrument should be stored over a long period of time in an environment meeting the following conditions, as well as those suggested above:

1. Temperature: 5℃ to 30℃
2. Relative humidity: 40% to 75%

Little temperature and humidity change per day

7.3 Calibration

This instrument can be calibrated only by the manufacturer and nobody else. Periodic calibration is recommended to sustain satisfactory performance.

APPENDIX

APPENDIX A SETTING ITEMS

Panel	Group box	Setting item	Initial value
Setup:Frequency	200M Clock Generator Setting:Clock	Clock Source	INT
		Reference	INT
		Frequency	200000
	200M Clock Generator Setting:Arming	Arming	INT
			ON
	200M Clock Generator Setting:Modulation	EXT Modulation	OFF
	Jitter Monitor	Monitor Mode	2UI

Appendix B Entry table of performance test result

Equipment name : MU163000A 200M Clock Generator unit
Manufacture No. : _____
Ambient temperature : _____℃
Relative humidity : _____%

- Internal clock test

Frequency[Hz]	Specifications	Results
200,000,000	±400	
100,001,000	±200.002	
10,000	±0.02	

Output level[V]	Specifications	Results
-1.1	±0.1	
-1.5	±0.1	

- External clock test

Output level[V]	Specifications	Results
-1.1	±0.1	
-1.5	±0.1	

- Lock output test

Frequency[Hz]	Specifications	Results
10,000,000	±20	

Output level[V]	Specifications	Results
0.5	±0.1	
-0.5	±0.1	

- Jitter modulation test (Range 2UI)

Jitter monitor value[UIp-p]	Specifications	Results
2.02	±0.151	
0.404	±0.0702	

- Jitter modulation test (Range 50UI)

Jitter monitor value[UIp-p]	Specifications	Results
5.752	±0.7876	
2.02	±0.601	

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